TEMPERATURE OF THE AIR.

[*In degrees Fahrenheit.*]

The distribution of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the high irregular surface of the Rocky Mountain plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *regular diurnal period* in temperature is shown by the hourly means given in Table IV for all stations having self-registers.

The mean temperature is given for each station in Table II, but in Table I both the mean temperatures and the departures from the normal are given.

The *monthly mean temperature* published in Table I, for the regular stations of the Weather Bureau, is the simple mean of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

As compared with the normal for February, the mean temperatures for the current month were decidedly in excess in Canada and the British Possessions generally, northern New England, the northern portion of the United States, and the whole Pacific coast as far south as San Diego. The ridge of greatest excess included the following: Minnedosa, 8.2; Walla Walla, 7.2; Spokane, 6.6; Qu'Appelle, 5.2; Edmonton, 5.0; Williston, 4.6; Father Point, 4.4

Considered by districts, the mean temperatures for the current month show departures from normal temperatures as given in Table I. The greatest positive departure was northern plateau, 5.4. The greatest negative departures were: South Atlantic, 12.7; Key West, 7.9; east Gulf, 13.3; west Gulf, 12.2; Ohio Valley and Tennessee, 12.4.

The *years of highest and lowest mean temperature* for previous years in February are shown in Table I of the REVIEW for February, 1894. The mean temperature for February, 1895, was the lowest on record at regular Weather Bureau stations throughout the Atlantic and Gulf States and Mississippi and Ohio valleys.

The *maximum and minimum temperatures* of the current month at regular stations of the Weather Bureau are given in Table I, which also gives the absolute maximum and minimum for the month during the entire period of Weather Bureau observations. As the corresponding years are also given in this table it is easy to ascertain whether any absolute maximum or minimum has occurred during the present year.

The *greatest daily range of temperature and the extreme monthly range* are given for each of the regular Weather Bureau stations in Table I, which also gives data from which may be computed the extreme monthly ranges for each station. The largest values among the greatest daily ranges were: Rapid City, 60; Havre, 56; Pueblo, 53. The smallest values were: Tatoosh Island, 11; Key West, 14. Among the extreme monthly ranges the large values were: Bismarck, 103; Huron, 101.

The *accumulated monthly departures* from normal temperatures since January 1 are given in the second column of the following table, and the average departures are given in the third column, for comparison with the departures of current conditions of vegetation from the normal conditions.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	°	°		°	°
Northern plateau	+ 8.7	+ 4.4	New England	— 4.2	— 2.1
North Pacific	+ 3.4	+ 1.7	Middle Atlantic	—11.5	— 5.8
Middle Pacific	+ 2.2	+ 1.1	South Atlantic	—13.8	— 6.9
Southern Pacific	+ 1.7	+ 0.8	Key West	— 9.3	— 4.6
			East Gulf	—14.6	— 7.3
			West Gulf	—11.8	— 5.9
			Ohio Valley and Tenn.	—15.6	— 7.8
			Lower Lake	—10.6	— 5.3
			Upper Lake	— 6.4	— 3.2
			North Dakota	— 1.7	— 0.8
			Upper Mississippi	—10.5	— 5.2
			Missouri Valley	— 5.6	— 2.8
			Northern slope	— 3.8	— 1.9
			Middle slope	— 5.8	— 2.9
			Southern slope (Abilene)	—13.8	— 6.9
			Southern plateau	— 1.8	— 0.9
			Middle plateau	— 3.2	— 1.6

The *limit of freezing weather* is shown on Chart VI by the isotherm of minimum 32° and the limit of frost by the isotherm of minimum 40°.

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by means of the weight contained in a cubic foot of air, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporometer may be made to give the *quantity of water evaporated* from a *similar surface* during any interval of time. Such an evaporometer, therefore, would sum up or integrate the effect of those influences that determine the temperature as given by the wet bulb; from this evaporation the average humidity of the air during any given interval of time may be deduced.

It is much to be desired that one or more new series of measurements of evaporation, wind velocity, temperature, and dew-point be made at high and low stations in instrument shelters similar to those used by the Weather Bureau, in order that a general empirical formula may be devised for use with the evaporometer considered as an integrating hygrometer.

The *sensible temperature* experienced by the human body and attributed to the atmosphere depends not merely upon the temperature of the air, but equally upon the dryness and the wind. It would seem that the rapid evaporation from the body in dry, hot weather reduces the temperature of the layer of nerve cells at the surface of the skin. This reduction, or sensible coolness, is approximately proportional to the difference between the dry and wet bulb thermometers.

The resulting sensible temperatures are simply the temperatures of the wet-bulb thermometer as obtained by the whirling apparatus used in the shaded shelter, and correspond to the temperatures felt by persons standing in the shade of trees or houses, exposed to a natural breeze of at least 6 miles per hour. The temperature of the wet-bulb thermometer and

its depression below the dry bulb are the fundamental data for all investigations into the relation between human physiology and the atmosphere. In order to present a monthly summary of the atmospheric conditions from a hygienic and physiological point of view, Table VIII has been prepared, showing the maximum, minimum, and mean readings of the wet-bulb thermometer at 8 a. m. and 8 p. m., seventy-fifth meridian time.

PRECIPITATION.

[*In inches and hundredths.*]

The *distribution of precipitation* for the month of February, 1895, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The precipitation was greatest, 8 to 10 inches, in the northwest corner of Washington, and least, averaging less than 1 inch, throughout the watersheds of the Ohio, Missouri, and Upper Mississippi.

The *diurnal variation* is shown by Table XII, which gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 37 are float gauges and 6 are weighing gauges.

The *normal precipitation* for each month is shown in the Atlas of Bulletin C, entitled "Rainfall and Snow of the United States, compiled to the End of 1891, with Annual, Seasonal, Monthly, and other Charts."

The *current departures* from the normal precipitation are given in Table I, which shows that precipitation was deficient over nearly the whole of the United States. It was, however, in excess in several small regions, viz: from Port Eads and the coast of Texas over central Texas, eastern New Mexico, Kansas, western Colorado, Nebraska, and South Dakota as far north as Pierre; in Montana, Assinniboia, and Alberta as far north as Edmonston; on the south Atlantic coast from Charleston to Jacksonville, and in isolated places such as Tatoosh Island, Carson City, Fresno, Father Point, Chatham, Titusville, and Key West.

The *average departure* for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normal exceeds 100):

Above the normal: Key West, 152; northern slope, 141; middle slope, 181; Abilene (southern slope), 207.

Below the normal: New England, 28; middle Atlantic, 40; south Atlantic, 89; east Gulf, 62; west Gulf, 64; Ohio Valley and Tennessee, 24; Lower Lake, 41; Upper Lake, 50; North Dakota, 67; Upper Mississippi, 26; Missouri Valley, 39; southern plateau, 54; middle plateau, 92; northern plateau, 30; north Pacific, 56; middle Pacific, 54; southern Pacific, 39.

The *years of greatest and least precipitation* are given in the REVIEW for February, 1894. The precipitation for the current month was the least on record for the month of February at most regular Weather Bureau stations in the Atlantic States and Ohio Valley, Missouri, Arkansas, and Louisiana.

The *total accumulated monthly departures* from normal precipitation from the beginning of the year to the end of the current month are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	*Per ct.*		*Inches.*	*Per ct.*
New England	— 3.10	62	South Atlantic	+ 1.50	119
Middle Atlantic	— 1.00	86	Key West	+ 2.10	156
East Gulf	— 2.20	80	Northern slope	+ 0.30	126
West Gulf	— 2.60	65	Middle slope	+ 0.30	120
Ohio Valley and Tennessee	— 2.40	73	Southern slope (Abilene)	+ 1.40	168
Lower Lakes	— 1.40	74	Middle plateau	+ 1.00	135
Upper Lakes	— 0.40	90	Middle Pacific	+ 0.80	108
North Dakota	— 0.20	84	South Pacific	+ 2.30	162
Upper Mississippi	— 1.80	53	Southern plateau	+ 0.00	100
Missouri Valley	— 1.20	54			
Northern plateau	— 1.40	68			
North Pacific	— 4.00	78			

Details as to excessive precipitation are given in Tables XIII and XIV.

The total snowfall at each station is given in Table II.

The accumulation of snow in the Sierra Nevada range on the route of the Central Pacific Railroad was very remarkable. The snow was 22 feet deep on the summit level at the beginning of the month, and drifts of 40 and 60 feet covered the fir trees on the mountain slopes. The heaviest snow was between Blue Canyon and Emigrant Gap, and snowslides were imminent. The map of normal distribution of annual snowfall seems to show that the maximum fall occurs along the Sierra opposite and a little north of San Francisco, as though the upper currents of air from the southwest, passing through the depression in the Coast Range near that city, carried the moisture northeastward to the neighborhood of Emigrant Gap.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere, as a whole, is very nearly constant from year to year, but the proportion received by the surface of the earth depends largely upon the absorption by the atmosphere, and varies with the distribution of cloudiness. The sunshine is now recorded automatically at 18 regular stations of the Weather Bureau by its photographic, and at 26 by its thermal effects. The results are given in Table XI for each hour of local, not seventy-fifth meridian, time. The cloudiness is determined by numerous personal observations at all stations during the daytime, and is given in the column of "average cloudiness" in Table I; its complement or clear sky is given in the last column of Table XI.

COMPARISON OF SUNSHINE AND CLEAR SKY.

The sunshine registers give the *duration* of direct sunshine whence the percentage of possible sunshine is derived; the observer's personal estimates give the percentage of *area* of clear sky. It should not be assumed that these numbers should agree, and for comparative purposes they have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observer's personal estimates of percentages of area